

The Refractor

The Bulletin of the Eastbay Astronomical Society
 Founded in 1924 at Chabot Observatory, Oakland, California

Volume 80
 Number 7
 March 2004

The Eastbay Astronomical Society Annual Awards Dinner

Sunday, March 7, 2004

5:45 pm – Doors Open

6:45 pm – Dinner

Speaker and Awards approx 8:00 pm

Chabot Space & Science Center
 Planetary Landscapes Hall, Dellums Building

Speaker: Dr. Phil Plait, *The Bad Astronomer*
 Subject: *Seven Ways a Black Hole Can Kill You*

Dr. Phil Plait is an astronomer and educator at Sonoma State University, where he develops educational materials based on NASA space science. He is better known as "The Bad Astronomer", debunking myths, misconceptions, and misuses of astronomy. His Bad Astronomy website (<http://www.badastronomy.com>) is one of the most popular astronomy sites on the web. There he tackles cosmic silliness head-on, ripping apart claims that the Apollo Moon landings were faked, Planet X will kill us all, and that scientists have no sense of humor. Dr. Plait wrote a book titled (surprise!) "Bad Astronomy", and is currently working on a second book, as well as several magazine articles, TV shows, and a way to keep his washing machine from squeaking during the spin cycle.

Title: Seven Ways a Black Hole Can Kill You

Face it: black holes are cool. They are ferocious devourers of matter, energy, and even space itself, and they excite our imagination even as they fill us with dread. Certainly, falling into one would be the last thing you would ever do, but that's not the only way a black hole can kill you. It turns out there are at least seven ways, including ripping you to pieces, irra-

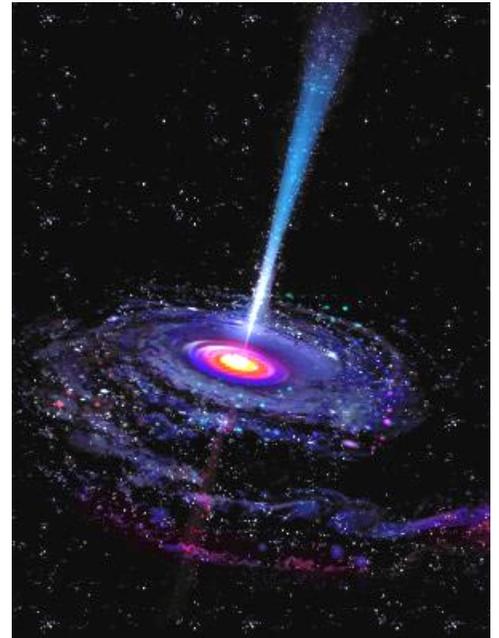
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Astronomer Phil Plait (webmaster of Bad Astronomy at www.badastronomy.com) will light-heartedly show you all the nasty and gruesome ways a black hole can ruin your day, and in the process show you what black holes are, how they form, how they can die, and how scientists have figured all this out.

This year's Helen Pillans Award goes to Mike Reynolds for his strong support of amateur astronomy and insistence on having a place for the Telescope Makers Workshop at the Chabot Space & Science Center.

The dinner will be catered by Harry's Hofbrau featuring Roast Beef, Turkey, Ham and Spinach Lasagna. This dinner received rave reviews the past eight years. ★

To register, look for the form inside this issue.



NASA Illustration of a super-massive black hole at the center of a galaxy, shooting out beams of particles at relativistic speeds (near the speed of light!)

Inside This Issue:

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George Gamow: Astrophysicist in Wonderland

By Ellis Myers

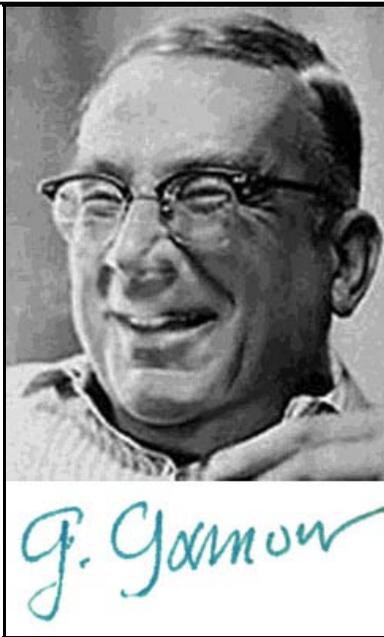
One hundred years ago, March 4, 1904, Gyorgy Antonovich Gamow (pronounced Gäm-ov) was born in Odessa, Ukraine.

His father was a teacher of Russian language and literature in a private high school for boys. As a youngster George was attracted to science, particularly physics and mathematics; for his thirteenth birthday his father gave him a small telescope and George became an astronomer. He attended Novorossia University in Odessa for a year; but because the school had no lectures in physics he transferred to the University of Leningrad. He had a falling out with one of his professors, who wanted him to become a meteorologist, while he was determined to become a theoretical physicist. He became a colonel in the Red Army Field Artillery School, where his assignment was to teach cadets the elements of physics and meteorology. At the same time, he took classes at the university and earned a diploma.

En route to the Ph.D. degree, which was awarded by the University of Leningrad in 1929, he studied at the Optics Institute (now called Saint-Petersburg State Institute of Fine Mechanics and Optics) and at Göttingen University in Germany, at the Royal Danish Academy of Sciences in Copenhagen, and at Cambridge in the laboratory of Sir Ernest Rutherford. Niels Bohr offered him a fellowship at the Theoretical Physics Institute of the University of Copenhagen where, along with Bohr, Werner Heisenberg and others, he made major extensions of quantum theory in explaining the nucleus of the atom.

It was while at Bohr's institute that Gamow collaborated with Austrian physicist Fritz Houtermans and English astrophysicist Robert Atkinson on the first calculation of stellar thermonuclear energy generation, based largely on Gamow's earlier insights into the mechanism of nuclear reactions.

Gamow returned to Russia in 1931 to become a professor at the University of Leningrad. He was one of the first of those scholars who fled Europe because of communist or fascist oppression during the 1930s. His first attempt to escape was when he and his new wife tried to cross the Black Sea to Turkey in a small kayak, carrying only a few provisions such as boiled eggs, chocolate, and two bottles of good brandy for the 170-mile passage. After 36 hours, however, a



gale developed and they found that they were being blown backward, stern first. They had to return, exhausted, and they had to extricate themselves from inquisition by Soviet officials, explaining that the unexpected storm spoiled the crafts sea trials.

He made other attempts. He planned to take a motorboat from Murmansk across an arm of the Barents Sea to Norway; and thought of skiing across the border into Finland. Both these ventures were thwarted. Then, in 1933, opportunity knocked, and Gamow was asked to represent the Soviet Union at a scientific conference in Brussels. He inveigled the government to allow his wife to accompany him as his secretary and passports were arranged. After the conference he was invited to lecture at the University of Michigan. While there, he received

an offer from George Washington University in Washington, D.C. He accepted the position, requesting that his title be made Visiting Professor because he feared trouble from Russia if it were known that he was in reality defecting. He also requested that Edward Teller be brought to the United States to join him. Gamow worked with Teller and Subrahmanyan Chandrasekhar on the problems of stellar energy, thermonuclear reactions and the expanding universe.

Gamow became a United States citizen just before the country entered World War II. During the war, Gamow was engaged by the US Navy as a consultant working primarily on mechanisms of explosives; Albert Einstein, who was at Princeton at the time, was a colleague in this work.

After the war Gamow returned to teaching at George Washington University. He asked his student, Ralph Alpher, to look into the question of the origin of the elements and their cosmic abundances. The study led to their proposal that space initially expanded through extreme heat and pressure, then cooled down. This implied the existence of a cosmic background radiation. In 1965 Arno Penzias and Robert Wilson dramatically corroborated their hypothesis with the discovery that brought them the Nobel Prize for 1967.

The theory also implied that the elements were formed as the result of sequential neutron capture. Against Alpher's objections, Gamow invited Hans Bethe (who had nothing to do with the work) to have his name on the paper, because he wanted it to be known as the Alpher-Bethe-Gamow (α - β - γ Greek symbols *alpha*, *beta*, and *gamma*) hypothesis. This is one of the most famous scientific papers, The Origin of Chemical Elements, the origin of the

Continued Page Three

The Origin of Chemical Elements

R. A. ALPHER¹
Applied Physics Laboratory, The Johns Hopkins University,
Silver Spring, Maryland

AND

H. BETHE
Cornell University, Ithaca, New York

AND

G. GAMOW
The George Washington University, Washington, D. C.
February 18, 1948

As pointed out by one of us,¹ various nuclear species must have originated not as the result of an equilibrium corresponding to a certain temperature and density, but rather as a consequence of a continuous building-up process arrested by a rapid expansion and cooling of the primordial matter. According to this picture, we must imagine the early stage of matter as a highly compressed neutron gas (overheated neutral nuclear fluid) which started decaying into protons and electrons when the gas pressure fell down as the result of universal expansion. The radiative capture of the still remaining neutrons by the newly formed protons must have led first to the formation of deuterium nuclei, and the subsequent neutron captures resulted in the building up of heavier and heavier nuclei. It must be remembered that, due to the comparatively short time allowed for this process,¹ the building up of heavier nuclei must have proceeded just above the upper fringe of the stable elements (short-lived Fermi elements), and the present frequency distribution of various atomic species was attained only somewhat later as the result of adjustment of their electric charges by β -decay.

Eastbay Astronomical Society

Eightieth Anniversary Dinner

Sunday, March 7, 2004

Astronomy Hall of Chabot Space & Science Center

10000 Skyline Boulevard, Oakland



The doors open at 5:45 pm, with Dinner at 6:45 pm. Awards presentation, door prizes and lecture approx 8:00 p.m.

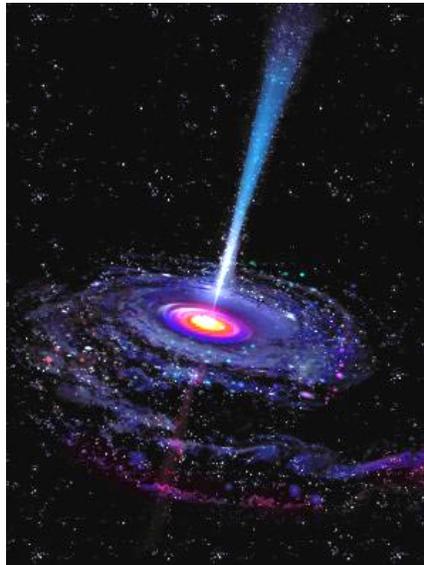
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The dinner will be catered by **Harry's Hofbrau** featuring Roast Beef, Turkey, Ham and Spinach Lasagna.
This dinner received rave reviews the past eight years.

Cost per person will be \$33.00. Mail your checks, payable to the EAS, as soon as possible with the form below, or bring it with you to the next meeting, or give it to Carter Roberts at CSSC some Friday evening. Get your reservation in soon to guarantee a seat. We must give the caterer a final count by March 1st.

Questions?
Contact EAS Treasurer Don Stone at
(707) 938-1667
or email him at
ddcstone@earthlink.net

EAS Banquet — March 7, 2004
Reservation Form

Your name: _____

Address: _____

City/State/Zip: _____

Phone: _____ Email: _____

Number of guests: _____ x \$33.00 = \$ _____

Names of additional guests _____

Please make your check payable to the EAS and send it with this form to:

Don Stone — EAS Banquet
19047 Robinson Road
Sonoma, CA 95476-5517

A Note of Thanks from Chabot's Director



This is a thank you from Alex Barnett, Executive Director of CSSC for the hard work and cooperation during the recent event surrounding the landing of the Mars rover Opportunity on January 24, 2004.

Well, its about 11:40pm (on Saturday night January 24th), I'm in my PJ's with a glass of wine and reflecting on the fact that I witnessed two remarkable things this evening.

The first was a successful landing by Opportunity on the Martian surface. The second was the smooth operation of a science center that surpassed all expectations. It was busy, but we did brilliantly!! And a huge number of first timers.

I understand we did more than 1500 people today. As you celebrate that, recall Adrienne Barnett and her team sold tickets to each one of those, using a system that they are still shaking down, and the line barely was ever out the door. They kept it moving! Recall that most of those people were met and greeted by a number of staff, board members and volunteers.

Recall that most of those people had to be ushered, served food and drink, shown rovers, exhibits, shows and eventually entertained with the landing. And then they exited through the shop with Dylan at the helm! No mean feat at all.

Some highlights and thank you's in no particular order, because I'm tired. Apologies if I miss someone.

To Cynthia who showed up with her husband and was immediately pressed into service at the bottom of the driveway directing traffic. To Dick and Jean Spees resplendent in volunteer shirts, ushering, greeting etc.. To Ed Thomas who came in and was immediately given a job to do..! To Bill, Teri, Wiley, Cynthia, David, Rick and a large cadre of volunteers who were everywhere and doing an awesome job of answering questions, looking out for people, keeping everyone safe and happy.

To the Galaxy Explorers, Heather and Lisa, also omnipresent, usually with a Rover in hand (Kenny and team) or a telescope (Jacob and team) To my wonderful team of commentators on the landings. Guys, I heard so much good stuff about everything you did - Eric, Ben, Celeste, Denni, Tom, Ryan (in the planetarium), Gibor Basri, and the astros - Dave, Carter and others who all added value to the landings in ways that were really appreciated. To Mary, who got great T shirts, and trouble shooted anything and everything at the front from first thing this morning until she closed the building tonight - 9am-11pm! To Dwayne, who floor managed, organised chairs, security, technical, pipe and drape, and spent lots of time as a cashier doing 'will call'.

To Conrad, Alan, Ken S and the Telescope teams, ready to dodge those clouds, give directions and inspiration at any opportunity. To Tamara, willing to leap into action for an exhibit, a sign, or just about anything! To Jim, Frank, Humberto, and Alan R for getting us going and keeping us going!

To Cass, Charles and the JNO team who directed traffic and kept us all safe and sound To Judyth, who kept the press happy and found them people to interview, even when we were all running around trying to avoid it! To Candyse, who set up food, greeted, gave directions and then became Marti Martians keeper, patrolling and giving excellent customer service. To Dionne, handling the little one's all day... To Rene, keeping it shiny and clean all day.

And to anyone I've missed....THANK YOU!!

I hope you all realized that we grew a lot as a team tonight. We were on form, with board, staff and volunteers all working together to give 1500 people a great time. Yes, we've learned a few more things to tweak, but boy, are we getting better at this!!

I'm seriously proud to be part of Chabot.

Alex

Gamow

Continued from Page Two

Big Bang. The first paragraph of this paper is shown in the accompanying figure.

Gamow's scientific interests stopped nowhere. They included both abstract and recreational mathematics, the thermodynamics of turbine and internal combustion engines, astrophysics, the properties and structure of the interior of our planet, the application of the theories of relativity and quantum mechanics to natural phenomena from subatomic to galactic, and the chemical and biological complexity of matter.

Having read the famous paper by Francis Crick and James Watson that described the double-helix structure of DNA, Gamow outlined a scheme for connecting the 20 amino acid building blocks. He relayed his thoughts in a letter to Crick in mid-1953. Unfortunately, he was wrong! But his ideas were so close to the truth that they pointed the way to the real solution to the genetic code.

George Gamow was described as being ebullient, charismatic and fun-loving He spoke six languages, and was once called the only scientist in America with a real sense of humor. His popular science books, such as *Mr. Tompkins in Wonderland*, were able to explain such concepts as curved space, the uncertainty principle, and Plancks constant through delightful anecdotes. For example, Mr. Tompkins experiences a world in which the speed of light is just 10 miles per hour! Another of his books, *Puzzle-Math*, exhibits an example of Gamows light-hearted personality. (In signing my copy of this book of brain-twisters, he calls himself a Puzzle-Mather.)

In 1954, Gamow was a Visiting Professor at UC Berkeley, and in 1956 he became Professor of Physics at the University of Colorado, where he continued his writing and his research until the time of his death in 1968.

This is how Edward Teller described his friend: Gamow was fantastic in his ideas. He was right, he was wrong. More often wrong than right. Always interesting; ... and when his idea was not wrong it was not only right, it was new. ☆



Editor's News 'n Views

Howdy Astro Fans!

The big news this month, of course, is our Annual Awards Dinner. We've been around since 1924, so that makes this year our 80th birthday! That's a lot of

turkey, roast beef, and ham consumed from Harry's Hofbrau (well, that is if we had really been using Harry's Hofbrau for all those many years, which we haven't, but we are using them again this year – *yes!*). We're a little worried this time around, though, as we still don't have enough people signed up for it to fill our minimum quota of 50 attendees, yet. If you haven't done so, please get your registrations in ASAP, so **Carter** and **Don** won't have heart attacks.

Speaking of heart attacks, our Programs Director, **Dave Rodrigues** (aka, *The Astro Wizard*), had to *really* pull a rabbit out of his hat this time around, when the speaker he had arranged for our event, Dr. Jeff Moore from NASA, had to cancel his engagement with us a month before the event occurred (that's a **BIG yikes!**) But, beneath that calm, cool exterior, Dave quelled the gibbering monkey bouncing around inside his brain and almost instantly got us yet *another* big name speaker to replace Dr. Moore – the world famous *Bad Astronomer*, **Dr. Phil Plait!** If you've never seen him before, Dr. Plait is a highly entertaining, funny, and educational speaker, whose mission it is: to battle the forces of knuckleheadedness with regard to the public's perception of the space sciences. Everything from the "faked" moon landings TV show, to that non-existent apocalypse that miraculously passed us by last Spring (Planet X!), Dr. Plait has calmly and consistently debunked these and other pseudo-scientific hoaxes with impeccable logic and science.

Some sad news this month – **Dan Arthur**, friend of EAS Board Member **Paul Hoy**, and avid volunteer up at Wightman Plaza on most Friday and Saturday nights, died this month while at home from what was probably an epileptic seizure. Dan really loved astronomy, and was

working to become a volunteer telescope operator for Chabot. He could often be found "working the line," using his own laptop to show his self-produced



PowerPoint presentations about Saturn, Mars, or Jupiter to entertain and edify the people waiting in lines for the telescopes. He was always enthusiastic and cheerful, and will be sorely missed by his family and friends.

Coming up in the not-too-distant future: Astronomy Week (April 19 – 25) and Astronomy Day (April 24th). On Astronomy Day, Carter Roberts and possibly Linda Lazeretti will do public solar viewing out at the Oakland Zoo, and Dave Rodrigues and I will do public solar viewing out at Jack London Square during the day, and possibly some nighttime viewing of, well, it looks like we've got our pick that evening: Jupiter, the Moon, Mars, and Saturn will all be out and about, and so, probably, will we. Anyway, if you'd like to help us out at either location, let us know. It's a lot of fun, doing these outreach events – people really appreciate the chance to look through a telescope and learn about "all that stuff up there," and it's particularly rewarding to see the kids go "WOW!" Plus, we promote the EAS and Chabot Space & Science Center, hand out hand-outs, and generally talk-up astronomy in general. Both Carter's and my phone numbers and email addresses are listed on the back page of this newsletter, and we could certainly use whatever help you'd be willing to offer!

Coming up: We've got another **EAS Member's Only View Night** at Chabot's antique telescopes on **Sunday, March 14**. Be sure to call Don Saito (510) 482-2913 after 4pm to verify if the weather looks iffy. On **Saturday, May 1st**, starting 9:30 am, the Northern California Historical Astronomy Luncheon and Discussion Association (**NCHALADA**) will hold their meeting in the Soda Board Room. Subjects: Asteroid Orbit Families by Bruce Mehlman, and in the afternoon, Cosmic Rays, by Nancy Cox. ★

Communique

By Walter C. Cambra

*Heavenly Hosts Steeped In A Sea
Of Swarming Ghosts...
Tell-Tale Twinkles From Beyond
Our Coasts...
Star Spirits Enconced In Flesh,
Permeate The Celestial Mesh...
Twinkles From Eye To Eye, Travel
Fast As Heavenly Sighs...
Of All Of Our Planets And All Of
Our Globes...
We Receive And Transmit Through
Our Lobes...
Water Falls of Galaxies Pouring
Through Space...
We Are Part And Parcel Of One Celestial Race!*



Spare Shots



◀ EAS Dir of Equipment, Ken Swagerty, won't let little things, like multiple fractures keep him away from his duties.

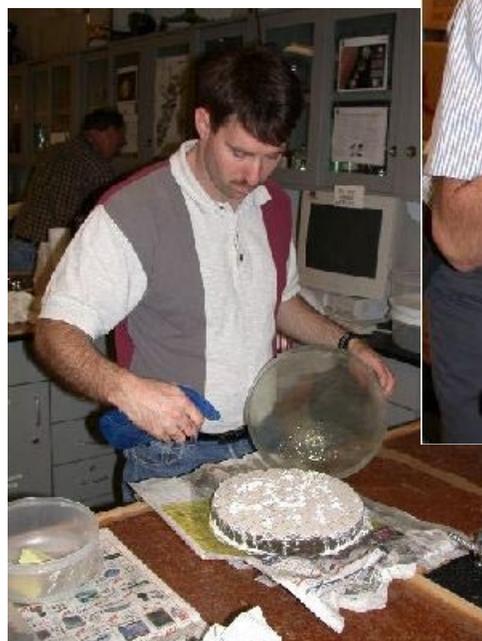
▶ Ken & Carter reinstall Rachel's RA dial



◀ The Galaxy Explorers do what it takes to refurbish Chabot's old, forgotten telescopes, so they may be used to promote astronomy once again!



▼ Telescope maker moistens the grit on the tool before putting his mirror blank on top to continue Grinding away, working to achieve his perfect parabola.



▲ Conrad Jung takes a peek at Jupiter through the eye of Leah, the 8" refractor, which is 121 years old(!) this year ☆

◀ Dave Barosso using the Ronchi Tester to check somebody's mirror progress.

▶ Huge solar prominence. Image by C. Roberts, 1/21/2004 from his front yard in Berkeley using his Coronado Max Scope 40, Nikon Coolpix 990, 18mm eyepiece

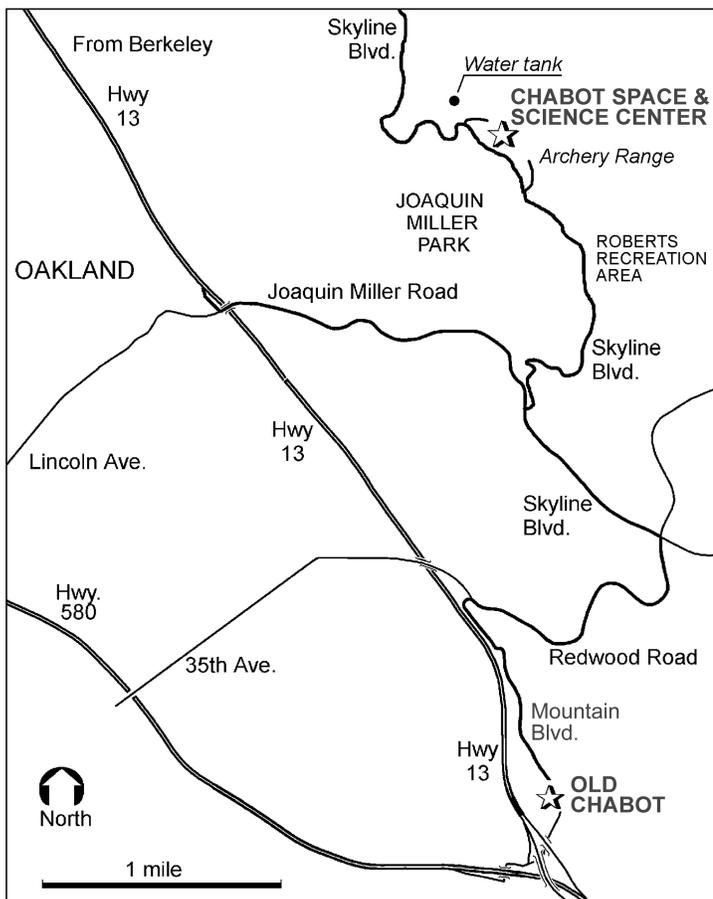




Eastbay Astronomical Society

At Chabot Space & Science Center
10000 Skyline Boulevard ● Oakland, CA 94619

March 2004
RETURN SERVICE REQUESTED



FUTURE CONJUNCTIONS

- Mar 7 EAS Annual Awards Dinner at Chabot, Planetary Landscapes Hall, Dellums Bldg, 5:45pm, Dinner at 6:45pm
- 11 EAS Board Meeting, Chabot, Soda Board Rm, 7:30pm
- 14 EAS Members' Only View Night (call to Don Saito to confirm)
- Apr 3 EAS General Meeting at Chabot, 7:30pm Physics Lab
- 18 EAS Members' Only View Night (call to Don Saito to confirm)
- 24 Astronomy Day at Oakland Zoo and Jack London Square
- May 8 EAS General Meeting at Chabot, 7:30pm Physics Lab
- 13 EAS Board Meeting, Chabot, Soda Board Rm, 7:30pm

Eastbay Astronomical Society

| | | |
|------------------------|----------------|-------------------------|
| President: | Carter Roberts | (510) 524-2146 |
| | | cwroberts@earthlink.net |
| Vice President: | Phil Crabbe II | (510) 655-4772 |
| Treasurer, Membership: | Don Stone | (707) 938-1667 |
| | | ddestone@earthlink.net |

Articles and photos for *The Refractor* are encouraged. Deadline for the April 2004 issue is March 15, 2004. Items may be submitted by mail to the editor, Don Saito, 3514 Randolph Avenue, Oakland, CA 94602-1228. Internet email address: donsaito@pacbell.net Hm: (510) 482-2913.

Join the Eastbay Astronomical Society

- Regular, \$24/year
 - Family, \$36/year
 - Contributing, \$40/year
 - Student, \$15/year (digital)
 - Sustaining, \$60/year or more newsletter, only)
- Contact: Don Stone, EAS Membership Registrar
Telephone: (707) 938-1667 Email: ddestone@earthlink.net
Mail: 19047 Robinson Road, Sonoma, CA 95476-5517